AATGAAAGACCCCACCTGTAGGTTTGGCAAGCTAGCTTAAGTAACGCCAT
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AGGTCAGGAACAGATGGAACAGCTGAATATGGGCCAAAGCGGATATCTGT
GGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAACAGATGGAACAGCTG
AATATGGGCCAAACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCA
GGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGCCCTCAGCAGTTTCT
AGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGACCTGAAATGACCCT
GTGCCTTATTTGAACTAACCAATCAGTTCGCTTCTCGCTTCTGTTCGCGC
GCTTCTGCTCCCCGAGCTCAATAAAAGAGCCCACAACCCCTCACTCGGGG
CGCCAGTCCTCCGATTGACTGAGTCGCCCGGGTACCCGTGTATCCAATAA
ACCCTCTTGCAGTTGCATCCGACTTGTGGTCTCGCTGTTCCTTGGGAGGG
TCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGTCTTTCATTTGGGGG
CTCGTCCGGGATCGGGAGACCCCTGCCCAGGGACCACCGACCCACCACCG
GGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTCCGATTGTCTAGTGT
CTATGACTGATTTTATGCGCCTGCGTCGGTACTAGTTAGCTAACTAGCTC
TGTATCTGGCGGACCCGTGGTGGAACTGACGAGTTCGGAACACCCGGCCG
CAACCCTGGGAGACGTCCCAGGTCGGGGGCCGTTTTTGTGGCCCGACCTG
AGTCCAAAAATCCCGATCGTTTTGGACTCTTTGGTGCACCCCCCTTAGAG
GAGGGATATGTGGTTCTGGTAGGAGACGAGAACCTAAAACAGTTCCCGCC
TCCGTCTGAATTTTTGCTTTCGGTTTGGGACCGAAGCCGCGCCGCGCGTC
TTGTCTGCTGCAGCATCGTTCTGTGTTGTCTCTGTCTGACTGTGTTTCTG
TATTTGTCTGAAAATATGGGCCCGGGCCAGACTGTTACCACTCCCTTAAG
TTTGACCTTAGGTCACTGGAAAGATGTCGAGCGGATCGCTCACAACCAGT
CGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAGAATGG
CCAACCTTTAACGTCGGATGGCCGCGAGACGGCACCTTTAACCGAGACCT
CATCACCCAGGTTAAGATCAAGGTCTTTTCACCTGGCCCGCATGGACACC
CAGACCAGGTCCCCTACATCGTGACCTGGGAAGCCTTGGCTTTTGACCCC
CCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCCTCCGCCTCCTCTTCC
TCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTCGACCCCGCCTC
GATCCTCCCTTTATCCAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGG
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CCCTGACATGACAAGAGTTACTAACAGCCCCTCTCTCCAAGCTCACTTAC
AGGCTCTCTACTTAGTCCAGCACGAAGTCTGGAGACCTCTGGCGGCAGCC
TACCAAGAACAACTGGACCGACCGGTGGTACCTCACCCTTACCGAGTCGG
CGACACAGTGTGGGTCCGCCGACACCAGACTAAGAACCTAGAACCTCGCT
GGAAAGGACCTTACACAGTCCTGCTGACCACCCCCACCGCCCTCAAAGTA
GACGGCATCGCAGCTTGGATACACGCCGCCCACGTGAAGGCTGCCGACCC
CGGGGGTGGACCATCCTCTAGACTGCCGGATCCCAGTGTGGTGGTAGGGA
ATTCAAGCTTGATCTCTATAATCTCGCGCAACCTATTTTCCCCTCGAACA
CTTTTTAAGCCGTAGATAAACAGGCTGGGACACTTCACATGAGCGAAAAA
TACATCGTCACCTGGGACATGTTGACAGATCCATGCACGTAAACTCGCAA
GCCGACTGATGCCTTCTGAACAATGGAAAGGCATTATTGCCGTAAGCCGT
GGCGGTCTGGTACCGGTGGGTGAAGACCAGAAACAGCACCTCGATCTGAG
CCGCGATATTGCCCAGCGTTTCAACGCGCTGTATGGCGAGATCGATCCCG
TCGTTTTACAACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACTTAAT
GGCCTTGGAGGACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGC

Figure 1

CCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATTGGCGAATGG
CGCTTTGCCTGGTTTCCGGCACCAGAAGCGGTGCCGGAAAGCTGGCTGGA
GTGCGATCTTCCTGAGGCCGATACTGTCGTCGTCCCCTCAAACTGGCAGA
TGCACGGTTACGATGCGCCCATCTACACCAACGTGACCTATCCCATTACG
GTCAATCCGCCGTTTGTTCCCACGGAGAATCCGACGGGTTGTTACTCGCT
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ATTTTTGATGGCGTTAACTCGGCGTTTCATCTGTGGTGCAACGGGCGCTG
GGTCGGTTACGGGCAAGACAGTCGTTTGGCGTCTTAATTTGAGCTCGAGC
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GAGTGACGGGAGTTATCTTGAAGATCAAGATATGTGGCGGATGAGCGGGA
TTCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGCGAATTGAATTATGGC
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TCAACAGCAACTGATGGAAACCAGCCATCGCCATCTGCTGCACGCGGAAG
AACCGACATGGCTGTTATACGACGGTTTCCATATGGGGATTGGTGGCGAC
GACTCCTGGAGCCCGTCAGTATCGGCGGAATTCCAGCTGAGCGCCGGTCG
CTACCATTACCAGTTGGTCTGGTGTCAAAAATAATAATAACCGGGCAGGC
CATGTCTGCCCGTATTTCGCGTAAGGAAATCCATTATGTACTATTTAAAC
TCGAGCGGCCGCCAGCACAGTGGTCGACGATAAAATAAAAGATTTTATTT
AGTCTCCAGAAAAAGGGGGGAATGAAAGACCCCACCTGTAGGTTTGGCAA
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GAATAGAGAAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATAT
GGGCCAAACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCC
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CAAGGACCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCG
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GGGGGTCTTTCATTCTGCATTAATGAATCGGCCAACGCGCGGGGAGAGGC
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TTTCCATAGGCTCCGCCCCCCTGACGAGCATCACAAAAATCGACGCTCAA
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CCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGACCCTGCCGCTTACCGG
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CAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACA
GAGTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATT
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GCTCTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTGTT

Figure 1

TGCAAGCAGCAGATTACGCGCAGAAAAAAAGGATCTCAAGAAGATCCTTT
GATCTTTTCTACGGGGTCTGACGCTCAGTGGAACGAAAACTCACGTTAAG
GGATTTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCTTTTG
CGGCCGGCCGCAAATCAATCTAAAGTATATATGAGTAAACTTGGTCTGAC
AGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTGTCTATT
TCGTTCATCCATAGTTGCCTGACTCCCCGTCGTGTAGATAACTACGATAC
GGGAGGGCTTACCATCTGGCCCCAGTGCTGCAATGATACCGCGAGACCCA
CGCTCACCGGCTCCAGATTTATCAGCAATAAACCAGCCAGCCGGAAGGGC
CGAGCGCAGAAGTGGTCCTGCAACTTTATCCGCCTCCATCCAGTCTATTA
ATTGTTGCCGGGAAGCTAGAGTAAGTAGTTCGCCAGTTAATAGTTTGCGC
AACGTTGTTGCCATTGCTACAGGCATCGTGGTGTCACGCTCGTCGTTTGG
TATGGCTTCATTCAGCTCCGGTTCCCAACGATCAAGGCGAGTTACATGAT
CCCCCATGTTGTGCAAAAAAGCGGTTAGCTCCTTCGGTCCTCCGATCGTT
GTCAGAAGTAAGTTGGCCGCAGTGTTATCACTCATGGTTATGGCAGCACT
GCATAATTCTCTTACTGTCATGCCATCCGTAAGATGCTTTTCTGTGACTG
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GGATCTTACCGCTGTTGAGATCCAGTTCGATGTAACCCACTCGTGCACCC
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AACAGGAAGGCAAAATGCCGCAAAAAAGGGAATAAGGGCGACACGGAAAT
GTTGAATACTCATACTCTTCCTTTTTCAATATTATTGAAGCATTTATCAG
GGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAA
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Figure 1

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TTAAGTAACGCCATTTTGCAAGGCATGGAAAAATACATAACTGAGAATAG
AGAAGTTCAGATCAAGGTCAGGAACAGATGGAACAGCTGAATATGGGCCA
AACAGGATATCTGTGGTAAGCAGTTCCTGCCCCGGCTCAGGGCCAAGAAC
AGATGGAACAGCTGAATATGGGCCAAACAGGATATCTGTGGTAAGCAGTT
CCTGCCCCGGCTCAGGGCCAAGAACAGATGGTCCCCAGATGCGGTCCAGC
CCTCAGCAGTTTCTAGAGAACCATCAGATGTTTCCAGGGTGCCCCAAGGA
CCTGAAATGACCCTGTGCCTTATTTGAACTAACCAATCAGTTCGCTTCTC
GCTTCTGTTCGCGCGCTTCTGCTCCCCGAGCTCAATAAAAGAGCCCACAA
CCCCTCACTCGGGGCGCCAGTCCTCCGATTGACTGAGTCGCCCGGGTACC
CGTGTATCCAATAAACCCTCTTGCAGTTGCATCCGACTTGTGGTCTCGCT
GTTCCTTGGGAGGGTCTCCTCTGAGTGATTGACTACCCGTCAGCGGGGGT
CTTTCATTTGGGGGCTCGTCCGGGATCGGGAGACCCCTGCCCAGGGACCA
CCGACCCACCACCGGGAGGTAAGCTGGCCAGCAACTTATCTGTGTCTGTC
CGATTGTCTAGTGTCTATGACTGATTTTATGCGCCTGCGTCGGTACTAGT
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GGAACACCCGGCCGCAACCCTGGGAGACGTCCCAGGGACTTCGGGGGCCG
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CGAAGCCGCGCCGCGCGTCTTGTCTGCTGCAGCATCGTTCTGTGTTGTCT
CTGTCTGACTGTGTTTCTGTATTTGTCTGAAAATAAGGGCCCGGGCCAGA
CTGTTACCACTCCCTTAAGTTTGACCTTAGGTCACTGGAAAGATGTCGAG
CGGATCGCTCACAACCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTAC
CTTCTGCTCTGCAGAATGGCCAACCTTTAACGTCGGATGGCCGCGAGACG
GCACCTTTAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTTCA
CCTGGCCCGCATGGACACCCAGACCAGGTCCCCTACATCGTGACCTGGGA
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CCCCACCGCCCTCAAAGTAGACGGCATCGCAGCTTGGATACACGCCGCCC
ACGTGAAGGCTGCCGACCCCGGGGGTGGACCATCCTCTAGACTGCCGGAT
CCCAGTGTGGTGGTAGGGAATTCTTAATTAACGCCACCATGGTGAGCAAG
GGCGAGGAGCTGTTCACCGGGGTGGTGCCCATCCTGGTCGAGCTGGACGG
CGACGTAAACGGCCACAAGTTCAGCGTGTCTGGCGAGGGCGAGGGCGATG
CCACCTACGGCAAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTG
CCCGTGCCCTGGCCCACCCTCGTGACCACCCTGACCTACGGCGTGCAGTG
CTTCAGCCGCTACCCCGACCACATGAAGCAGCACGACTTCTTCAAGTCCG
CCATGCCCGAAGGCTACGTCCAGGAGCGCACCATCTTCTTCAAGGACGAC

Figure 2

GGCAACTACAAGACCCGCGCCGAGGTGAAGTTCGAGGGCGACACCCTGGT
GAACCGCATCGAGCTGAAGGGCATCGACTTCAAGGAGGACGGCAACATCC
TGGGGCACAAGCTGGAGTACAACTACAACAGCCACAACGTCTATATCATG
GCCGACAAGCAGAAGAACGGCATCAAGGCGAACTTCAAGATCCGCCACAA
CATCGAGGACGGCAGCGTGCAGCTCGCCGACCACTACCAGCAGAACACCC
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CAGTCCGCCCTGAGCAAAGACCCCAACGAGAAGCGCGATCACATGGTCCT
GCTGGAGTTCGTGACCGCCGCCGGGATCACTCTCGGCATGGACGAGCTGT
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TATATCGGCATAGTATAATACGACAAGGTGAGGAACTAAACCATGGCCAA
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TTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCG
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CGATAAGTCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATA
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ATTTTTGTGATGCTCGTCAGGGGGGCGGAGCCTATGGAAAAACGCCAGCA
ACGCGGCCTTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATA
TCGATTAGTCCAATTTGTTAAAGACAGGATATCAGTGGTCCAGGCTCTAG
TTTTGACTCAACAATATCACCAGCTGAAGCCTATAGAGTACGAGCCATAG
ATAAAATAAAAGATTTATTTAGTCTCCAGAAAAAGGGGGG

Figure 2

```
             .        20         .        40         .        60         .        80
  1 AAGGGCCCGGGCCAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCACTGGAAAGATGTCGAGCGGATCGCTCACAA  80
    | ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
  1 ATGGGCCCGGGCCAGACTGTTACCACTCCCTTAAGTTTGACCTTAGGTCACTGGAAAGATGTCGAGCGGATCGCTCACAA  80
             .        20         .        40         .        60         .        80
             .       100         .       120         .       140         .       160
 81 CCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAGAATGGCCAACCTTTAACGTCGGATGGCCGC 160
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 81 CCAGTCGGTAGATGTCAAGAAGAGACGTTGGGTTACCTTCTGCTCTGCAGAATGGCCAACCTTTAACGTCGGATGGCCGC 160
             .       100         .       120         .       140         .       160
             .       180         .       200         .       220         .       240
161 GAGACGGCACCTTTAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTTCACCTGGCCCGCATGGACACCCAGAC 240
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
161 GAGACGGCACCTTTAACCGAGACCTCATCACCCAGGTTAAGATCAAGGTCTTTTCACCTGGCCCGCATGGACACCCAGAC 240
             .       180         .       200         .       220         .       240
             .       260         .       280         .       300         .       320
241 CAGGTCCCCTACATCGTGACCTGGGAAGCCTTGGCTTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCC 320
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
241 CAGGTCCCCTACATCGTGACCTGGGAAGCCTTGGCTTTTGACCCCCCTCCCTGGGTCAAGCCCTTTGTACACCCTAAGCC 320
             .       260         .       280         .       300         .       320
             .       340         .       360         .       380         .       400
321 TCCGCCTCCTCTTCCTCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTCGACCCCGCCTCGATCCTCCCTTTATC 400
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
321 TCCGCCTCCTCTTCCTCCATCCGCCCCGTCTCTCCCCCTTGAACCTCCTCGTTCGACCCCGCCTCGATCCTCCCTTTATC 400
             .       340         .       360         .       380         .       400
             .       420         .       440         .       460         .       480
401 CAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCCGCCCCTTGTAAACTTC 480
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
401 CAGCCCTCACTCCTTCTCTAGGCGCCCCCATATGGCCATATGAGATCTTATATGGGGCACCCCCGCCCCTTGTAAACTTC 480
             .       420         .       440         .       460         .       480
             .       500         .       520         .       540         .       560
481 CCTGACCCTGACAAGACAAGAGTTACTAACAGCCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAGCACGA 560
    ||||||||||||| ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
481 CCTGACCCTGACATGACAAGAGTTACTAACAGCCCCTCTCTCCAAGCTCACTTACAGGCTCTCTACTTAGTCCAGCACGA 560
             .       500         .       520         .       540         .       560
             .       580         .       600         .       620         .       640
561 AGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACTGGACCGACCGGTGGTACCTCACCCTTACCGAGTCGGCGACA 640
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
561 AGTCTGGAGACCTCTGGCGGCAGCCTACCAAGAACAACTGGACCGACCGGTGGTACCTCACCCTTACCGAGTCGGCGACA 640
             .       580         .       600         .       620         .       640
             .       660         .       680         .       700         .       720
641 CAGTGTGGGTCCGCCGACACCAGACTAAGAACCTAGAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCC 720
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
641 CAGTGTGGGTCCGCCGACACCAGACTAAGAACCTAGAACCTCGCTGGAAAGGACCTTACACAGTCCTGCTGACCACCCCC 720
             .       660         .       680         .       700         .       720
             .       740         .       760         .       780         .       800
721 ACCGCCCTCAAAGTAGACGGCATCGCAGCTTGGATACACGCCGCCCACGTGAAGGCTGCCGACCCCGGGGGTGGACCATC 800
    ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
721 ACCGCCCTCAAAGTAGACGGCATCGCAGCTTGGATACACGCCGCCCACGTGAAGGCTGCCGACCCCGGGGGTGGACCATC 800
             .       740         .       760         .       780         .       800
             .       820
801 CTCTAGACTGCCGGATCCCAGTGTGG  (SEQ ID NO:2)                                        826
    ||||||||||||||||||||||||||
801 CTCTAGACTGCCGGATCCCAGTGTGG  (SEQ ID NO:1)                                        826
             .       820

% Identity =  99.8 (824/826)
```

Figure 3

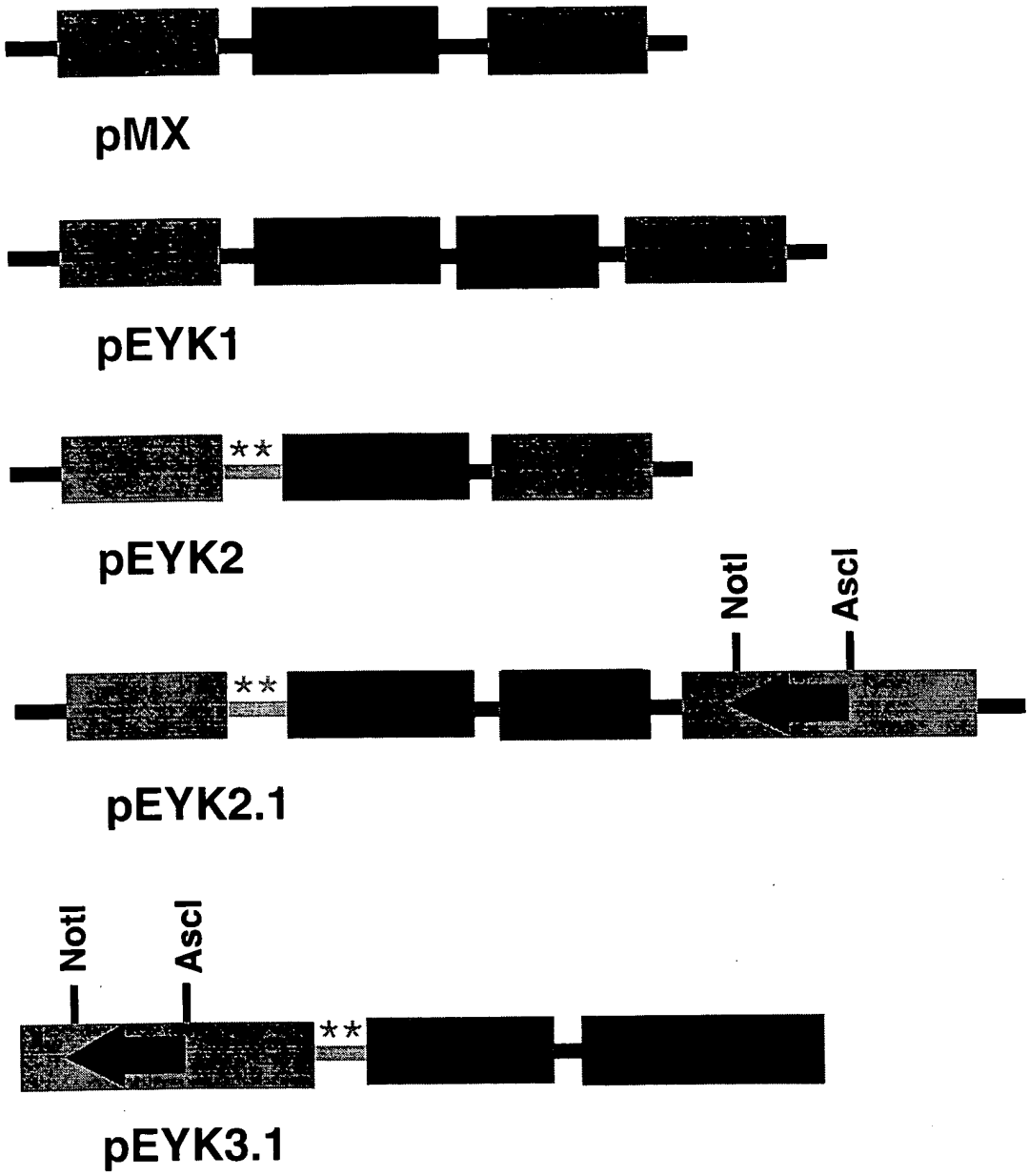
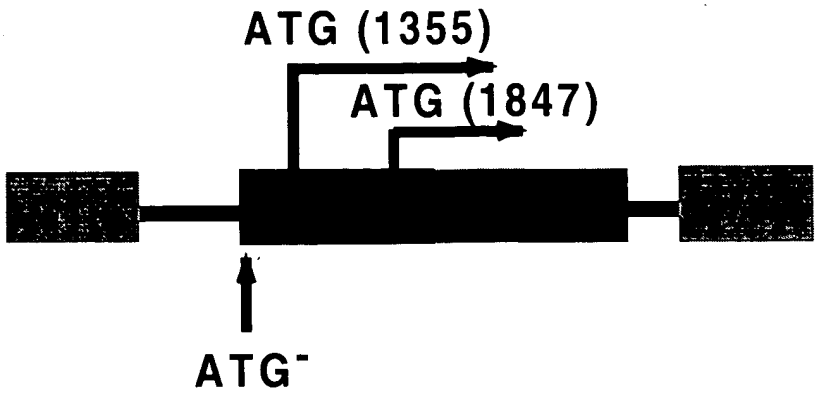


Figure 4

A) pMX



B) pEYK2

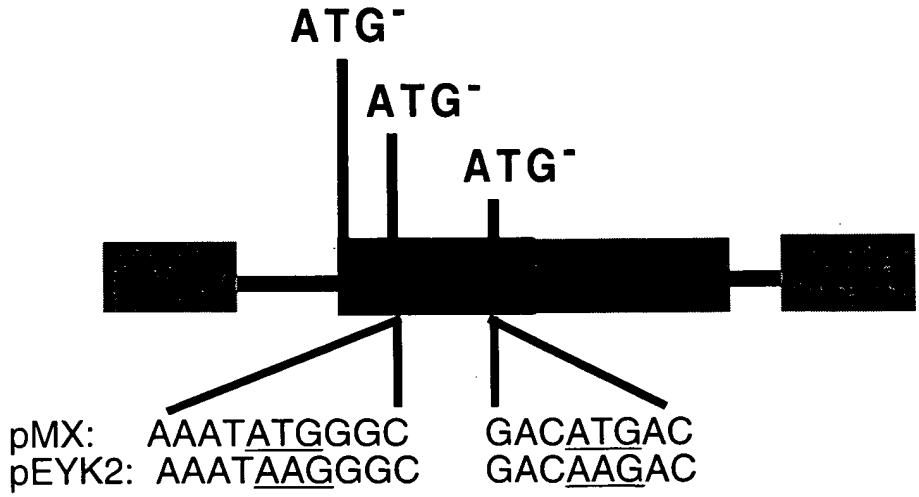
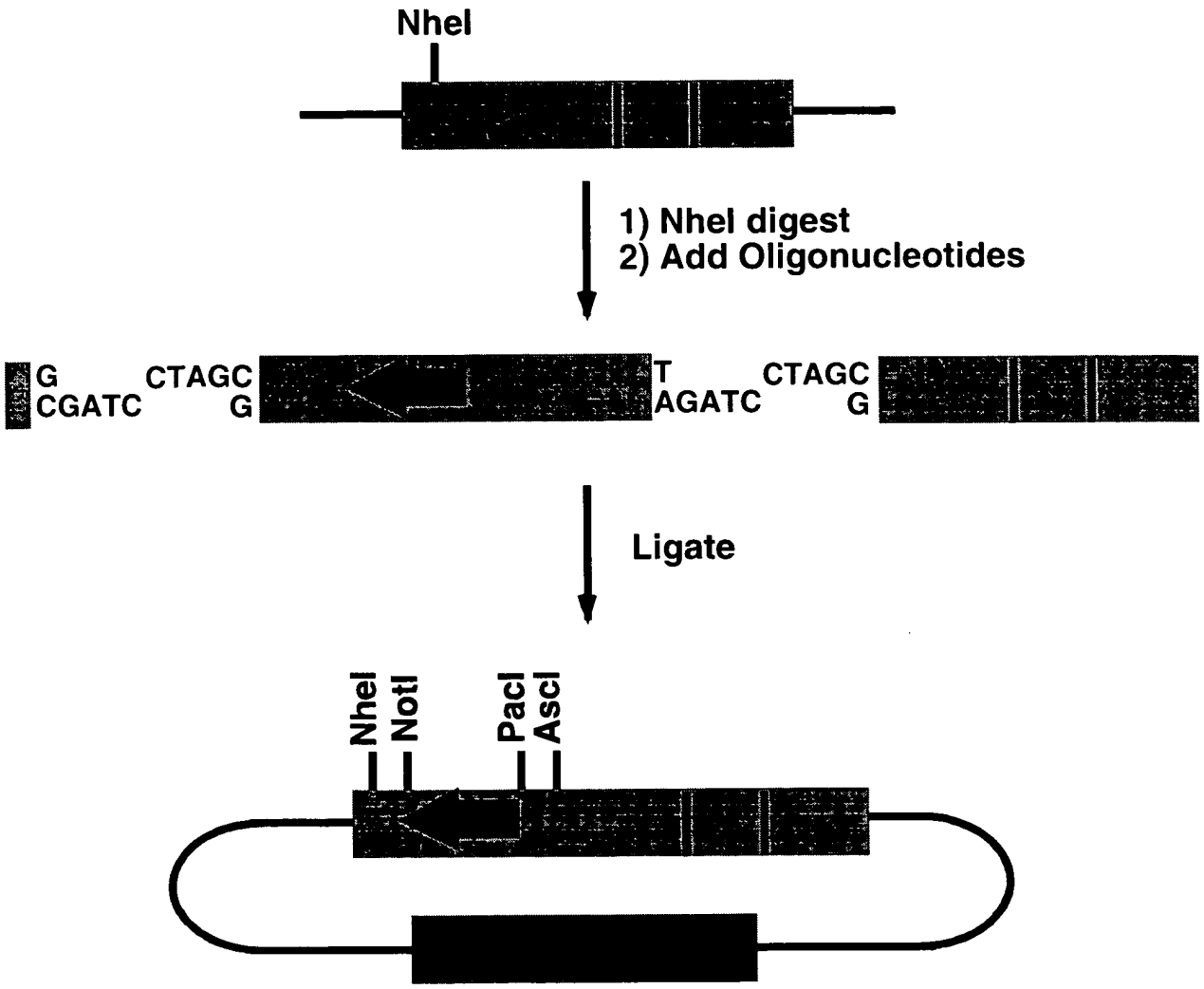


Figure 5



pEYK.7

Figure 6

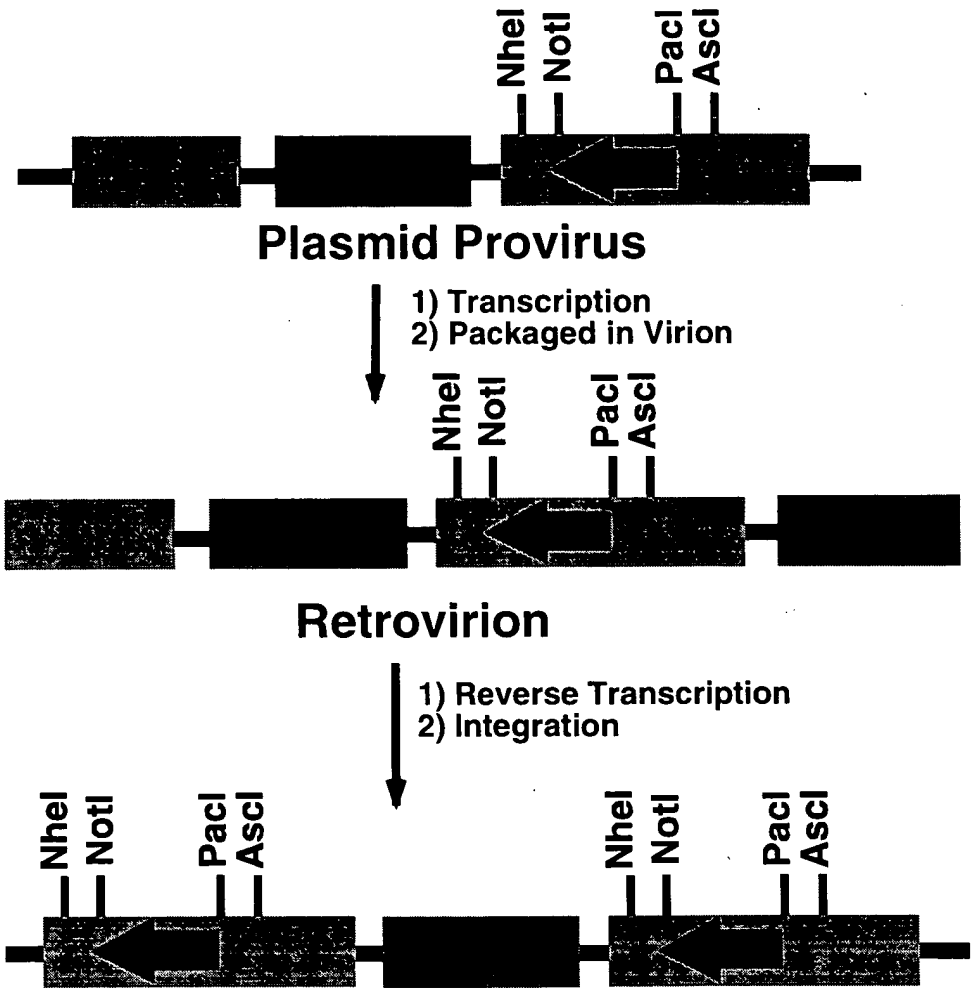


Figure 7

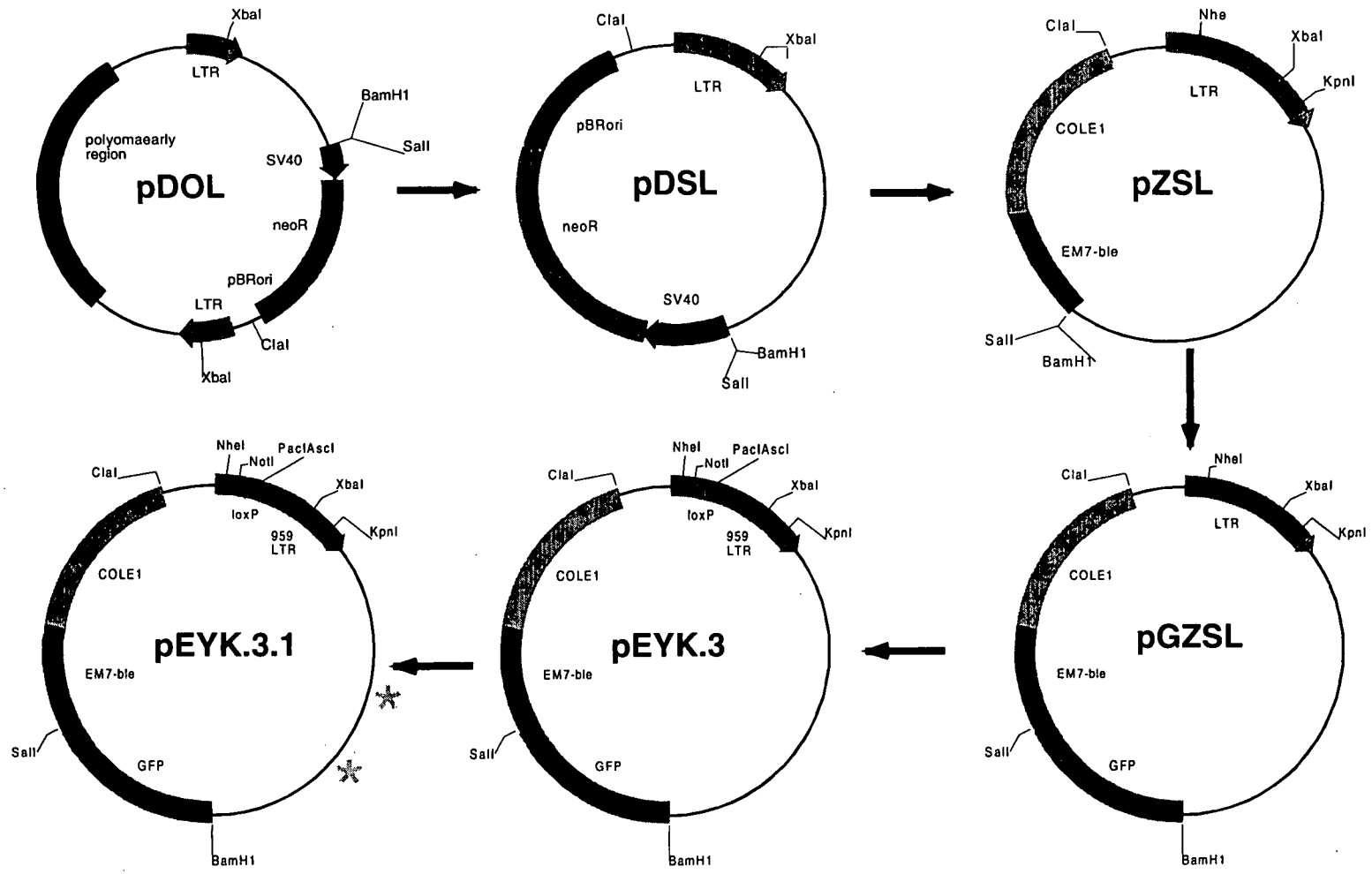
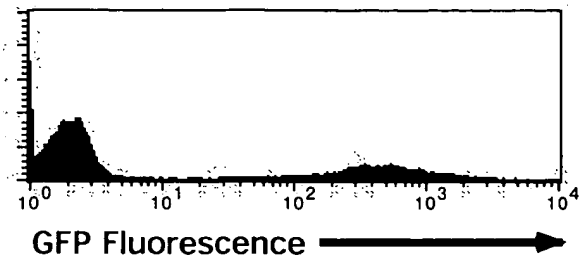

XbaI
LTR
BamH1
SalI
polyomaearly region
SV40
pDOL
neoR
pBRori
LTR
ClaI
XbaI
ClaI
XbaI
LTR
pBRori
pDSL
neoR
SV40
BamH1
SalI
ClaI
Nhe
XbaI
KpnI
LTR
COLE1
pZSL
EM7-ble
SalI
BamH1
NheI
PacIAscI
NotI
ClaI
XbaI
loxP
KpnI
959 LTR
COLE1
pEYK.3.1
EM7-ble
SalI
GFP
BamH1
NheI
PacIAscI
NotI
ClaI
XbaI
loxP
KpnI
959 LTR
COLE1
pEYK.3
EM7-ble
SalI
GFP
BamH1
NheI
ClaI
XbaI
LTR
KpnI
COLE1
pGZSL
EM7-ble
SalI
GFP
BamH1

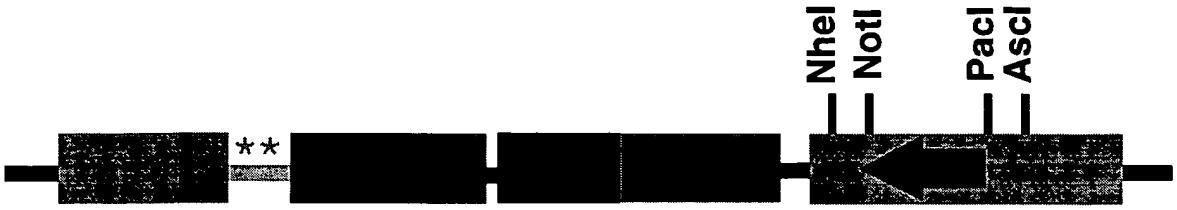
Figure 8

pEYK.2.2

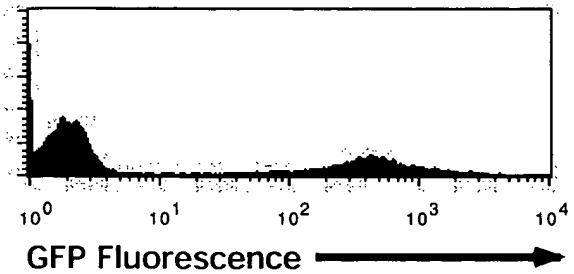


Titer: 7.2×10^6 IFU / mL

Fold expression: 206



pEYK.2.3

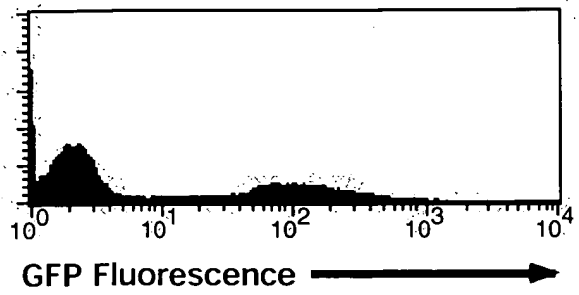


Titer: 7.0×10^6 IFU / mL

Fold expression: 203

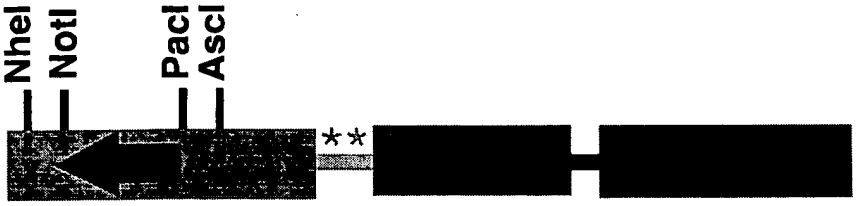
Figure 9

pEYK3

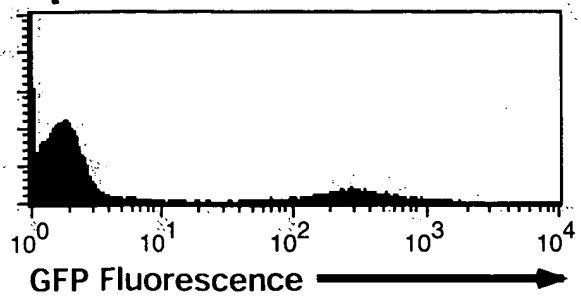


Titer: 1.0 x 10^6 IFU / mL

Fold expression: 33



pEYK3.1



Titer: 1.0 x 10^6 IFU / mL

Fold expression: 121

Figure 10

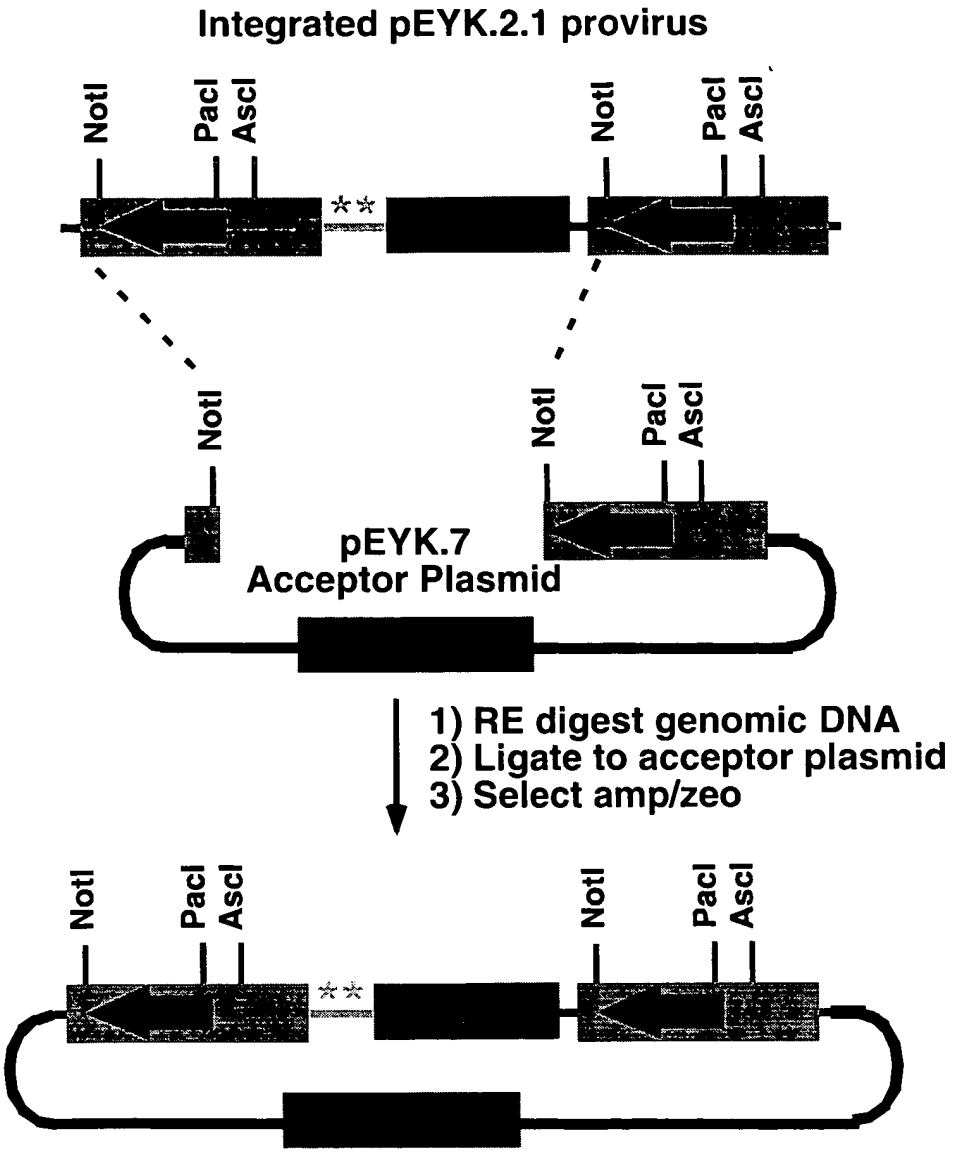

Integrated pEYK.2.1 provirus
NotI
PacI
AscI
NotI
PacI
AscI
**
NotI
NotI
PacI
AscI
pEYK.7
Acceptor Plasmid
1) RE digest genomic DNA
2) Ligate to acceptor plasmid
3) Select amp/zeo
NotI
PacI
AscI
NotI
PacI
AscI
**

Figure 11

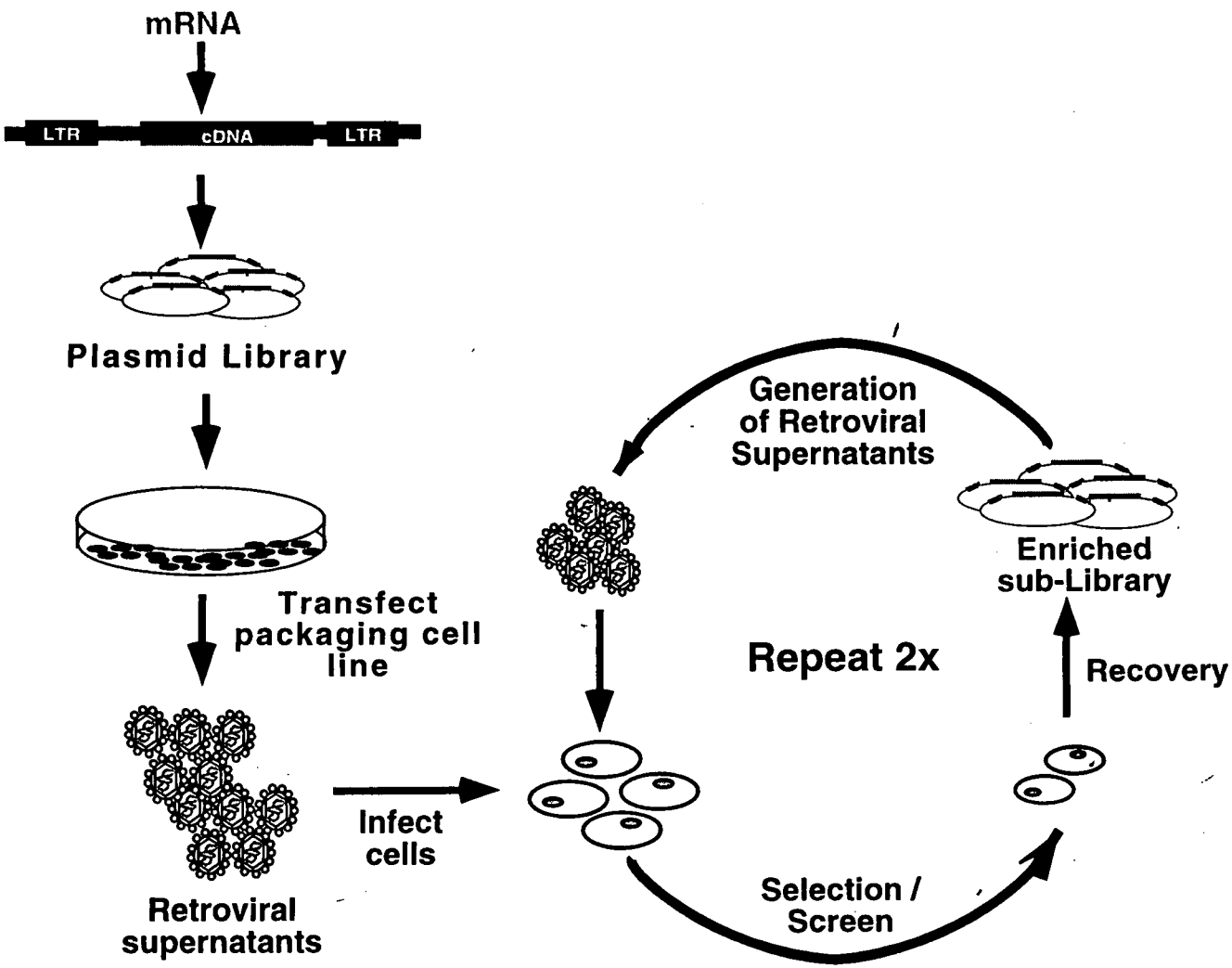
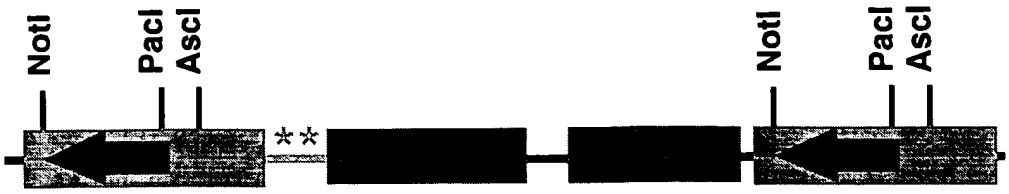

mRNA
LTR
cDNA
LTR
Plasmid Library
Transfect
packaging cell
line
Retroviral
supernatants
Infect
cells
Generation
of Retroviral
Supernatants
Enriched
sub-Library
Repeat 2x
Recovery
Selection /
Screen

Figure 12

A) Integrated B/A-pEYK.3.1 provirus



B)

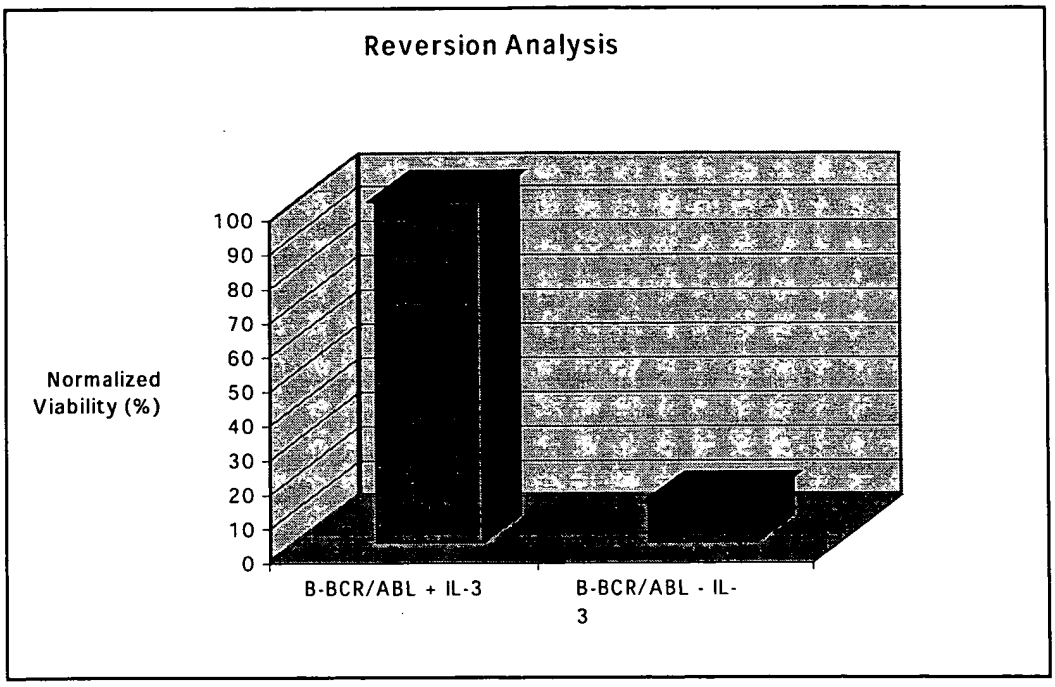


Figure 13